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From the Author
To R. Trewin
—

A N
E S S A Y
O N T H E
S E A - S C U R V Y :

Wherein is PROPOSED
An Easy METHOD of Curing That
Distemper at SEA;
AND
Of Preserving Water Sweet for any
Cruise or Voyage.

By ANTHONY ADDINGTON, M. D.

Experimentum de Re judicet. BACON.

R E A D I N G,

Printed by C. MICKLEWRIGHT: And Sold by M. COOPER
in *Pater-noster-Row*, London; and J. FLETCHER,
Bookfeller in *Oxford*. MDCCLIII.

(Price One Shilling.)

the true Causes, or on a successful Method of Cure, the Trials of candid, attentive, judicious Men may soon determine. I only beg Leave to say, I am not conscious that any Thing relating to either has been advanced by me, but what is warranted by good Authority, or Reason, or Experiment.

It is well known how often and how much Sea-faring Persons suffer from corrupted Water. That they may not suffer on this Account, I have communicated a Way, which I believe may be depended on, of Preserving Water Sweet for any Length of Time that can be wanted for a Cruize or Voyage.

IN the Perusal of this Treatise, Your Lordships will observe that I have not quitted the Ocean to find Remedies for a Disease, which, if it be not the Creature of the Ocean, undoubtedly rages there much more frequently and much more terribly, than on any Island or Continent. It seems, as if the Great Creator, Preserver, and Disposer of all Things, in His Infinite Wisdom and Goodness and Mercy, had in no Place or Clime permitted the Causes of Popular Sickness to abound, in which He hath not vouchsafed the Easy, the Obvious, the Certain Means of Health. This might be shewn at large in various Instances. But the Time of Your Lordships is of far greater Consequence

(vii)

quence to the Public, than to be
waisted in long Speculations of mine,
though directed to as Noble a Sub-
ject, as can employ the Faculties
of Man. I am,

MY LORDS,

Your much Obliged

and most Obedient Servant,

ANTHONY ADDINGTON.

A N
E S S A Y
O N T H E
S E A - S C U R V Y .

THE SEA-SCURVY generally begins with an unusual Oppression and Weariness, a difficult Respiration, and different-colour'd Spots dispersed over the whole Body, especially the Legs and Arms. These Symptoms increasing, by degrees are attended with a low unequal Pulse, lixivial Urine, a pale-brown or livid Complexion, a Weakness and Swelling or sometimes Wasting of the Legs, a Difficulty in walking, acute transient Pains, frequent Bleedings at the Nose, stinking Breath, putrid Gums, loose Teeth, ill-condition'd Ulcers, and rotten Bones. 'Tis said, on very good Evidence, that the Virulence

rulence of the Disease has been so great, as to force open Wounds which had been heal'd for many Years; and to dissolve the Callus of a broken Bone, which had a long time been completely form'd. It sometimes occasions sudden Death, especially on any Exertion of Strength, or on any hasty Motion. In the last Stage, which is contagious, it produces Horrors of Imagination; Trembling, fainting, convulsive, epileptic Fits; Weakness of Memory and Reason, Lethargies, Palsies, Apoplexies; purple, livid, and black Spots; violent Effusions of Blood from every internal and external Part of the Body; Putrid Fevers, Hætic, Continued, and Intermittent; exquisite Rheumatic Pains, Pleurifies, the Jaundice, obstinate Costiveness, Colics, Vomittings, Diarrhœas, Dysenteries, Mortifications.*

* In Confirmation of this Description of the Sea-Scurvy, see Cockburn on Sea-Diseases, p. 11. Boerhaave's Aphorisms, Aph. 1151. Lord Anson's Voyage round the World, from p. 142. to p. 146. Frid. Hoffmanni Opera, Tom. III. cap. 1. de Scorbuto. Sennerti Opera, Lib. 3. de Scorbuto, p. 249. & 256. ad 271. Severin. Eugalenus, Rondeletius, Belthaz. Brunerius, Henric. Brucæus, and others, de Scorbuto.

IF this Representation of the Symptoms be true, it can hardly be question'd, but that the immediate Cause of the Scurvy is a State of Humours, far advanced towards Putrefaction in the first Stage, and quite putrid in the last, which therefore is for the most part fatal. That the Humours in the Scurvy are either putrid, or have an extreme putrid Tendency, appears not only from the Symptoms, but also from the Testimony of several eminent Physicians. * But were there no Symptoms nor Authority to support the Truth of this Doctrine, it might, I think, be very clearly deduced from a careful Attention to those Things, which are known to do Good and Hurt in the Scurvy. This Distemper is constantly relieved by the Use of such Medicines as resist Putrefaction, and is as constantly aggravated by such as promote it.

BUT though a strong Disposition in the Fluids to corrupt, or a real Corruption of

* Vide *Monita & Præcepta Medica, Auctore Ric. Mead*, p. 226, Cap. *de Scorbuto*. Dr. *Huxham* in the Appendix to his Essay on Fevers, p. 260. *Frid. Hoffm. de Scorbuto*, p. 371.

them, seems to be the Effence of this Disorder, yet that Disposition, or that Corruption, is doubtless the Effect of other Causes. One of those Causes may be Uncleanliness in the Ship and in her Company. The Ship is unclean, when her Bilge Water is suffer'd to stink*; or her Decks are not well scraped and washed; or when fresh Air is not often convey'd to her dark Holes and Recesses; or when many putrid Effluvia stream from Nuisances on board her, such as corrupted Food, foul Ulcers, sick Men, dead Bodies, and the Ordure of Animals. Her Company is unclean, when they neglect airing their Bed-Cloaths, or changing their Linen, or sweetening their Persons. It is certain that Filth strongly disposes the Humours of our Bodies to Corruption, because no human Creature can live long in it, without either taking an

* Sea-Water putrefies so easily by Stagnation, that were it not for the moving of the Sea by the Force of Winds, Tides, and Currents, it would corrupt all the World. See Boyle on the Saltness of the Sea. *Ad res venenatas putridas, Corpori humano summè perniciosas, meritò referri debent Exhalationes ex Aquis stagnantibus & corruptis in Aërem evelatæ, &c.* F. Hoffm. *de Venenis in Aëre contentis.* See also Lancisi *Tract. de nexiis Paludum Effluviis.*

Antidote against it, or receiving from it the Taint of a putrid Disease. It has been known that the Nastiness of a Ship has been so great, as to infect not only her own Crew, but also those of neighbouring Ships.* To what Degree of Corruption the Humours of our Bodies may be exalted or alter'd by this means, we learn from those terrible pestilential Diseases, which so often break out in close Prisons, Passport Ships, crowded Barracks, Military Hospitals, and during tedious Encampments † and Sieges. We have Instances where the Filth in the Wells of several Ships has been permitted to rise to such a Pitch, as to prove an instant Poison to Persons let down into them. ‡

ANOTHER Reason why the Blood is so apt to putrefy at Sea is, at least as I judge, because the Air there is not enrich'd with a due Stock of vegetable Effluvia from the

* See Sutton's Historical Account of a new Method for extracting the foul Air out of Ships, &c. p. 1.

† *Morbi castrenses, qui omnium pessimi sunt, Aeris Vitiis & pravis Exhalationibus potissimum debentur.* F. Hoffm. de Venenis in Aëre, Tom. I. p. 210.

‡ See Mr. Sutton's Historical Account, &c. p. 13, 14.

Earth.

Earth. 'Tis evident that every Species of Beings enjoys the best State of Health in its proper Element. Aquatics droop by Land, as Land Animals do by Sea. Nay, amphibious Creatures themselves will not remain long in Health, if they are entirely restrain'd from either Habitation, that the All-wise Author of Nature design'd them. It is likely that a Scarcity at Sea of those Vapours, which never cease to exhale from the Plants of the Ground, is one Reason why the Blood is so inclined to putrefy there; because we observe that Sea-faring Men, who labour under very rank Scurvies, constantly grow better as soon as they set Foot on Shore. And though it be granted that their growing better is principally owing to their Removal from the foul Ship Air, yet it is not improbable that it is also in some measure owing to the Vapours or Exhalations of the Earth, which then surround them in great Abundance, and which consist chiefly of the most active acid balsamic Spirits of Trees, Shrubs, Grass, and Flowers, being much more freely imbibed into their Bodies, than they could be at Sea, and so giving a great and sudden Check to their

their near Approaches to Putrefaction. I think it may be inferr'd, that their Amendment depends in some measure on these acid ethereal Spirits, because in mid Ocean, when scorbutic Persons chance to be plentifully supplied with the Juices of Lemons, Oranges, Limes, Apples, and such kind of Fruits, they receive a Sort of Refreshment and Amendment from them, like what they receive from the Terrestrial Atmosphere.

A THIRD Cause, that disposes the Fluids to Corruption, may be Plenitude; to which Sailors are very subject, on account of their Voracity, Costiveness, and diminish'd Perspiration. We are assured by *Ramazzeni* * and *Helmont* †, that Sailors at Sea are voracious; and by the same Authors, and by Dr. *Cockburn* ‡, that they are apt to be costive; to which last Fault in their Constitutions the *English* Writer justly imputes many of their Maladies. Their Perspiration is diminish'd at Sea, because in general

* *Ramaz. Distrib. de Morbis Artificum*, p. 222.

† *Blas. hum.* N. 36.

‡ *On Sea Diseases*, p. 29.

they

they feed on groffer Food, and use lefs Exercise*, and breathe a moiſter Air there, than they do by Land. The Food on Ship-board conſiſts moſtly of Beef, Pork, Biscuit, Flour, Oatmeal, Peaſe, Butter, Cheeſe. The Advantages which ariſe from proper Exercise are, an Elasticity in the Solids of the Body, a vigorous Circulation of the Fluids, and a Promotion of the ſeveral Secretions. Where proper Exercise therefore is wanting, there muſt be a Debility in the Solids, a languid Circulation of the Fluids, and a Stagnation of them in the fineſt Veſſels and Strainers, among which are thoſe of the Skin. The extraordinary Moiſture

* The Want of Exercise, and great Dampneſs in the Air, are no uncommon Cauſes of the Scurvy, even among Land-Men. To one or other of theſe Cauſes we may aſcribe the ſcorbutic Complaints of many Students, Mechanics, and Perſons living in confined marſhy Places, and near the Sea. Dr. *Brownrigg*, in his uſeful Book on the Art of making common Salt, p. 173, 174, 175, has obſerv'd, that the Sea-Winds are wetter than the Land-Winds, and that the moſt frequent Winds in *Great Britain* are the South, South-Weſt, and Weſt. This being true, no doubt, the Scurvy prevails more on thoſe Coaſts of this Kingdom, than on any other: For it would be endleſs to produce all the Authorities extant, to prove that this Diſtemper has ever been much more rife in damp, than in dry Situations.

of

of the Sea-Air lessens Perspiration by relaxing the Fibres of the Skin. The more relax'd the Skin is, the less Matter in a given Time will be discharged by it. 'Tis uncertain in what Quantity Perspiration is lessen'd by this Means: But let it be supposed, (though many times it may be much more) that it is five Ounces each Day; it will then follow, that [somewhat more than] ^{12 1/2 lb. or 39. mod,} thirty-eight Pounds Troy Weight of that ^{that is 38 lbs} Fluid, which ought to have been discharged, will be accumulated in the Habit in one Quarter of a Year. A Plenitude or Redundance of Humours, occasion'd by the Means I have mention'd, or by the Suppression of some accustom'd Hæmorrhage, or by the Absorption of Moisture from the Air into the Lungs and Pores of the Skin, or by any other Means, disposes the Fluids to corrupt; inasmuch as it both implies and causes a longer Confinement of them in the Body, than they ought to undergo; and as it is the Nature of all animal Fluids, by such Confinement, * to grow foul and degenerate into a State of Putrescence. This

* *Vide Boerhaave's Aphor. 80, 83. Frid. Hoffm. de Venenis Corporis humani, Tom. I. Part. 2. Cap. 3. p. 206.*

State is observed to happen more frequently to the Aged, than to the Young; to the Tender, than to the Hardy; to the Timorous and Gloomy, than to the Bold and Chearful; to Favourites, than to Slaves; to Marines, than to common Sailors; to common Sailors, than to their Officers; in Winter, than in Summer; in long Calms, than in Weather that is changeable and often windy; in new Ships, than in old ones; in the Royal Navy, than in the Merchant Service. To conclude this Head: Although a Plethora may be, and very often is, a remote Cause of the Scurvy, I would not by what has been said be understood to mean that it is always so. I know the Scurvy has been produced where there was an evident Inanition. And we are inform'd by a Physician*, who had good Opportunities of knowing the Truth, that more than a fourth Part of those who labour under it, fall into it after their Recovery from Fevers and other Distempers.

ANOTHER Cause, that promotes Putrefaction in the Bodies of Seamen, is the Bad-

* Dr. W. Cockburn, in his Book on Sea Diseases, p. 206.

ness of their Provisions. Common Water makes Part of their Provisions. Their Provisions are bad, when they are rancid, or putrid, or worm-eaten; which they often are, either from close Air, or moist warm Air, or Time, or Negligence, or unavoidable Accidents. That putrid Food and Water promote Putrefaction, we are convinced by good Authorities * and by Experience. The Reason why they promote it is, because when received into our Bodies, even in a small Quantity, they have a Power (which differs under different Circumstances) of dissolving their Texture, and of changing their constituent Parts into a fetid Sanies, like their own; as a Spark of Fire, falling on proper Combustibles, kindles them into Flames. What has been said of putrid Diet is true in a less Degree of that which is mouldy, or eaten by Worms and Weevils; for every Tendency to Rancidity is a proportionable Tendency to Putrefaction, and the Production of Insects

* See *Frid. Hoffm. de Scorbuto*, p. 374. Sect. 26. Dr. *Huxham's* Appendix to an Essay on Fevers, p. 259. The Reverend Dr. *Hales's* Philosophical Experiments, p. 81. *Boerhaave's* Aphor. 1150.

is an actual Effect * of it. Not that it should be imagined from hence, that every Effect of Putrefaction occasions it in other putrescible Bodies; at that Rate Nitre would have a Place among the Promoters of Putrefaction. It is only meant, that when Putrefaction is so far advanced in any Body, as to favour or contribute to the Production of Insects, a certain Principle is at the same time let loose *in* or disengaged *from* that Body, which Principle has the Power of infecting or hastening Corruption in other Bodies.

If it be ask'd what that Principle is, or on what Principle the Power, wherewith putrid Substances dissolve or corrupt our Bodies, depends; whether on their Water, or Oil, or volatile alkaline Salt, or Earth, into which they are alike reduced, and may alike be analysed †; or on some other Principle that is invisible to us, and cannot be exhibited by the chemical Art? I answer, That it probably depends on some invisible

* — *Putrescentia infecta animata sequitur.* LUCRETIVS.

† *Vide Boerhaave's Chemistry, Part II. p. 201.*

Principle;

Principle; and may be very like, if not the same with that *sylvestrian* * poisonous Spirit, which is secretly detach'd and unseen flies from Vegetables in the Act of Fermentation. This Principle of Corruption, or this poisonous Spirit, whatever it be, seems for wise and noble Purposes to be implanted more or less in each Individual of the animal and vegetative Kingdoms, since each is subject to Putrefaction, and when putrid yields it, whether it putrifies in a Place confined from or open to the Air. That the Power of putrid Substances, in promoting the Dissolution of our Bodies, is not owing to their volatile alkaline Salts, as has been generally thought, is abundantly confirm'd by a Number of very curious and very useful Experiments †, made by Dr. Pringle.

THE fifth and last Cause, and indeed a very material one, that gives the Humours such a putrid Disposition as immediately produces the Sea-Scurvy, is the White and

* Vide *Willis, Kerger, Beccher, Helmont, Boerhaave*, and the other Writers on Fermentation.

† Vide *Philosophical Transactions*, No. 495, 496.

Bay Salt, used to preserve Flesh for the Service of the Navy. 'Tis true, these Salts in a dry Place, either hot or cold, resist the Corruption of Flesh, and of other corruptible Bodies: But in a moist and warm Place, like a living human Body, they are just the reverse. That both Rock and Sea Salt, in a moist and warm Place, like a living human Body, hasten the Corruption of our Humours, and also the Corruption of the solid Parts of our Bodies, even of our Bones, I am satisfied by a Multitude of Experiments *. The Principle, by which they hasten it, is in many Respects analogous to that Poison, already taken notice of, in putrid Animals, and in putrid or fermenting Vegetables. Let it not be inferr'd from hence, that the common Use of these Salts

* This Fact is in part confirm'd by *Beccber* in his *Physica subterranea*, Lib. I. p. 142. *Solemus in quotidiano usu*, says he, *Salem edere, ut crassiora digerantur & resolvantur; sed cum nimium eo utimur, necessario Salis acrimonia mixti Animalis compagem solvit & corrumpit: imò hoc in Passu, si Humiditas superveniat, in horrendam Putredinem ducit. Nam—in Sale aliquid mercuriale latet, quod causticæ & exedentis naturæ est; hinc qui nimio Sale vescuntur—Scorbuto—vexantur; quòd nimius Salis usus corpus putrescere faciat.* See *Dr. Pringle's Experiments in the Philosophical Transactions*, No. 495, 496.

ought

ought to be forbid; since a moderate Degree of Putrefaction seems as necessary to the Support, as to the Production, of all created Life. The true Inference is, that, where it can be avoided, they should never be eaten in such large Quantities as to occasion a greater Dissolution in the Body, than the Welfare of it requires; or, where that cannot be avoided, that a safe and effectual Corrector, if there be any such Thing, should be frequently given to counteract their dissolving or putrifying Quality.

HAVING endeavour'd to point out the immediate Cause, and also the distant Causes, of the Sea-Scurvy, I now proceed to its Cure; which may be undertaken with great Probability of Success in all Cases, except where the internal Parts are unsound, or the external much mortified. The grand Intentions certainly are; To remove what is redundant; and correct or remove what is putrescent or putrid. If the Patient then be on Shore, 'tis well known that the circumambient Air and the Fruits of the Ground will prove the best Remedies.

Dr.

Dr. Cockburn*, who was Physician to the Fleet, tells us that he has seen many scorbutic Persons put ashore in the weakest and most deplorable Condition, who by feeding only on Coleworts, Carrots, Cabbages, Turnips, and other *Green Trade*, as the Sailors call it, were able in three or four Days to walk several Miles. The Reason why Land Air and a vegetable Diet are so serviceable in this Disease is, because the acid Exhalations and Juices, with which they are fraught, continually mixing with the Blood, become at once the Purgers of Superfluities and the Opposers of Corruption. That they oppose Corruption will hardly be doubted. They purge Superfluities, because being eagerly attracted by, and soon saturated with, the volatile alkaline Salts, which ever in a putrid Scurvy abound in the Body, they readily form neutral Salts†; all which, whether natural or artificial, are purging.

* In his Treatise on Sea Diseases, p. 206, 207. And in his Preface to the same Work, p. 17.

† Vide F. Hoffm. de Salium mediorum eccellente in medendo virtute, p. 22, 23. Par. 31, 33, 38.

BUT

BUT if the Patient be far out at Sea, where he cannot have the Benefit of those Medicines which succeed so well by Land, another Method of Cure, not less efficacious perhaps, though less quick than that in Port, may be safely advised. In the first Place, if he has any Mark of Fulness, from whatever Cause it spring, let eight Ounces of Blood, or more or less, according to his Age, Strength, and other Circumstances, be taken from his Arm. I chuse to begin with Bleeding in all Cases, where there is a Fulness; and, where that is considerable, and Bleeding can be easily borne, but not else, to repeat it once or twice sparingly after proper Intervals; not because that Operation can much alter the bad Quality of the Humours, but because, by lessening their Quantity, it may be a Means of preventing internal Hæmorrhages and other Accidents. If the Reader should object to this Practice, he may find the same inculcated by a Variety of reputable * Au-

* Vide *F. Hoffm.* Tom. III. Cap. 1. *de Scorbuto*, Sect. 15. p. 379. *Boerhaav.* Aph. 1161. *Sennert.* *de Scorbuto*, p. 272. *Henric. Bruce.* p. 42.

thors. *Eugalenus*, though no Friend to the Lancet, as wisely recommends the free Use of it even in a scorbutic * Dropfy, where there are evident Signs of a Plethora, as he discourages it in a scorbutic † Pleurisy, where there are no such Signs. Nor is *Bruner* deterr'd from it by the Appearance of purple or livid Spots. ‡

In order to lessen the Quantity of redundant Blood still more, I would farther advise a gentle daily Purgation with Sea-Water; which now is very justly esteemed as a Cleanser of the Intestines, and indeed of the whole glandular System. Enough ought to be drank every Morning to procure two or three Motions in the Day. A Pint, more or less, taken at one or two Draughts, will generally answer this End. No Person, who requires Purging, need be under any Apprehension from a continued Course of it, occasion'd by Sea-Water;

* In his Book *de Scorbuto*, p. 94.

† P. 53, 54.

‡ Vide *Balb. Bruner. Tractat. de Scorbuto*, p. 11. *Vera Curatio — incipiat à Venæsectione. Nec impedit φλεβολομίαν Macularum Eruptio.*

it having been found by Experience * that a considerable Flux, thus promoted, has not only been supported with great Ease for several Months together by many very weak People, but that it has likewise given them fresh Vigour and Spirits. In Proportion to the Number of Stools gain'd by this Purge, provided they are not immoderate, the overcharged Patient will become stronger and easier, and observe with Joy a gradual Abatement of all his Complaints.

THIS Method of keeping the Body constantly open is not beneficial to those Persons alone, who are loaded with Humours; it is of Use to the Generality of those too, who have no Load, but a Depravity or Corruption only of Humours. Let it then in all Cases, except those hereafter to be mention'd, be faithfully persisted in from the Beginning of the Cure to the End. And it might be well for Sailors, if, when they are free from Scurvy, but have some other Complaint that indicates gentle Purging, or are in perfect Health, they would now and

* Vide *Dissertat. de Tabo glandulari*, Auctore Ric. Russell, M. D. p. 24, & passim.

then in the Morning early, perhaps twice a Week, have Recourse to a Draught or two of Sea-Water; by the timely Help of which most of the bodily Evils, to which they are liable, especially their Costiveness and its Consequences, may be either cured or prevented.

THE Advantages of a moderate and protracted Course of Purging in the Scurvy, both where there is a Plenitude and where there is none, have not escaped the Sagacity of some of the most celebrated Physicians. Dr. Boerhaave, without any Restriction to the particular Habit of the Patient, gives us the greatest Expectations “*à leni, attenuante, deobstruente Purgativo, “ parca Dosi sæpè iteratâ.”** And Dr. Fr. Hoffman † speaks to the same Purpose. ’Tis true, neither of those great Men, however lavish they may have been in their

* Vide *Aphorism.* 1160, 1161. 1164, 1165.

† Tom. III. Cap. i. de *Scorbuto*, Sect. 16. p. 379. *Quod attinet ad—Purgantia, de his nostra cum aliis peritioribus Medicis hæc est Sententia, quod, omnibus validioribus exclusis, lenissima tantum in Usum vocare debeat,—quæ—per Infusum aut lenem Decoctiorem usurpata, noxios Humores ex primis Viis blandè & per Epicrasin educendo, Opem omnino præstant utilissimam.*

Commendations of Sea-Salt upon other Occasions, have ever advised it, or the Water from whence it is procured, as a Purgative in the Scurvy. I am induced in this Case to prefer the Water from whence Sea-Salt is procured to all other Medicines of the purging Tribe, because its Use in Land-Scurvies*, which are nearly related to those at Sea, is warranted by Experience; and because I know none other of equal Gentleness, Goodness, and Efficacy, that can be got at Sea or any where else so easily, so cheaply, and so universally. If it be thought an Absurdity to propose Salt-Water as a fit Purge in the Scurvy, when it has been shewn that common Salt, actuated by Heat and Moisture, is one of the Causes of it; or if it be urged, that all brackish Springs, which are Emanations from the Sea, and may be consider'd as weaker Kinds of Sea-Water, are exclaim'd against as hurtful in the Scurvy by Writers † on that Subject: I reply, that common Salt and brackish Springs are either the Cause of or are

* Vide Ric. Russ. *de Tabæ glandulari*, p. 25, 26. 77.

† Vide Engelenum *de Scorbuto*, p. 104. *Videntur Angue pejus Aquæ—crudæ, salsæ.*

hurtful

hurtful in the Scurvy, because, being slow Purgatives, they are apt to be confined in the Body many Days before they pass it, and by such Confinement will corrupt the Body; but that Sea-Water, given in a proper Quantity, being a quick Purgative, is impatient of the like Confinement, and will therefore pass hastily, often in an Hour or two, through the Bowels, and carry with it its own Salts, before they can corrupt any Humours which they meet in their Course, and likewise Part of those putrid Humours, from which alone that terrible Train of Symptoms is derived, which are the usual Concomitants of the Scurvy.

BUT the Virtues of Sea-Water ought not to be engross'd by the Scurvy. This excellent Remedy hath been skilfully and successfully applied to various other Diseases by the Fathers of Physic, and by the Moderns. It was used by the Ancients either alone, or mix'd with Honey, or with Rain-Water and Honey, or with Wine.* In

* Vide Jo. Gorraei Parisiensis *Definitiones medicas*, under the Words *Θαλασσίνης οἴνου*, *scilicet θαλάττης*, *scilicet τεθαλασσωμένης*, and *Θαλασσόμελης*.

one or other of these Forms they frequently gave it as a Purge, where the Blood was redundant or impure, and where the Glands and small Vessels were furr'd or obstructed. It is used by the Moderns in the like Intentions, though without any Mixture of Honey, or Rain-Water, or Wine. But there is one Disease, in which it was not employ'd in the Days of old, but in which it hath here in *England* been very happily employ'd in these Days. I mean the Scrophula or Struma, commonly called the King's Evil; which often attacks the Eyes, Nose, Lips, Ears, Neck, Throat, Arm-Pits, Groin, Joints, carpal and metacarpal, tarsal and metatarsal Bones, Fingers, Toes, Lungs, Mesentery. It sometimes seizes other Parts too, both inward and outward. *Pomaret* gives an Instance, which we find in the Works of *Riverius* *, where several Bones of the Skull were dissolved and rotted by it. The surprizing Efficacy of Sea-Water in some

* Vide *Observation. communicat. à D. Dionysio Pomaret, Chirurgo Monpeliensi peritissimo*, Observ. 9; which concludes thus: *Notanda hic est mira Humoris Strumæ efficientis Malignitas, & Acrimonia, quæ Offa liquare ac dissolvere valeat.*

Cases

Cases of this Kind I have had an Opportunity of seeing ; and the same is confirm'd in most Cases of this Kind in that valuable Collection of Observations*, publish'd at Oxford about three Years ago by Dr. *Russell* of *Lewes* in *Suffex*.

SALT-WATER is useful in the Scurvy, not as an Evacuant only, but also as an Antiseptic ; for all neutral Salts are endued with this Power, till they have laid longer in our Bodies, than the Salts of Sea-Water ever lie in them, when that Water has been administer'd in a proper Dose. But, it must be own'd, the antiseptic Power of Salt-Water is so weak, that it is to be look'd upon rather as a Retarder of the Putrefaction of sound Humours, than as a Corrector or Sweetener of Humours already putrid. For this Reason, where there are Marks of Virulence in the Scurvy, as it will be lost Labour to rely on simple Sea-Water, unassisted with any other anti-putrid Medicine ; so if, in Conjunction with that Water, we make a prudent Use of the

* *De Tabæ glandulari, sive de Usu Aquæ-marinae in Morbis Glandularum Dissertatio.*

Spirit of Sea-Salt, we shall but seldom I believe be disappointed in our Hopes of a Cure. I have often restored stinking Water, Blood, Bile, Flesh, and many other putrid Bodies to Sweetness by this wonderful acid Spirit. This is that safe and effectual Corrector, which will * counteract the putrifying Quality of Rock and Bay Salt, when they have been taken in such large Quantities, as to occasion a greater Dissolution in the Body, than the Welfare of it requires. It ought to be kept in Glass Bottles, well secured with ground Stoppers; and should not be tasted or smelt to, till it hath been well diluted with Water.

TWENTY Drops of this Spirit taken every Day, in a proper Vehicle, will probably succeed with most Patients; though some may require more than double or triple that Number. Five of them may be given in the Sea-Water, which will be wanted every Morning to open the first Passages; and the Remainder, either at Meals or any other Time, in fresh Water; to a Pint of which ten Drops will impart

* See Page 15.

an Acidity, which will please the Palate, allay Thirst, and strengthen the Stomach. This Liquor, sweeten'd with Sugar, resembles Lemonade. If a fourth Part of Rectified Proof-Spirit is added to it, the Compound will answer the Purposes of Punch.

THE Notion of some, that Spirit of Salt is universally unwholsome, and productive of incurable Obstructions, is entirely groundless. In proper Doses, it cannot but be beneficial to all Constitutions, where the natural Salts have a volatile alkaline Tendency, as they always have in the Scurvy: For, being saturated with volatile alkaline Salts, it will be converted into true * Sal Ammoniac; which is acknowledged to be wholsome, and capable of removing some of the most obstinate Obstructions.

THE antiseptic Excellence of Spirit of Salt was well known to the Chemists and Physicians of the last, and at the Beginning of the present, Century. *Glauber* †

* Vide *Boerhaave's Chemistry*, translated by Dr. *Dalton*, Part II. Process 147. p. 289.

† In his Books *de Consolatione Navigantium & Prosperitate Germaniæ*.

tells

tells us, That it serves for Kitchen-Uses better than Vinegar; that it preserves Water and other Things, both living and dead, from Putrefaction; and is serviceable in Diseases of the Camp and Navy. The incomparable *Fr. Hoffman* and *Boerhaave* had the Wisdom to give it frequently for many great Intentions, but more especially as a Corrector of putrid Humours: Which Virtue though it possesses in common with the other Mineral Acids, yet, in the Scurvy and in most other Diseases, and for many other Purposes, I chuse to give it in Preference to them, because they are more styptic, more corrosive, less volatile, less subtile, less penetrating.

THE Methods of preparing this Acid are to be learnt from almost all the modern Books of Pharmacy and Chemistry. Dr. *Boerhaave* * tells us, That any Quantity of Salt will yield about a third Part of Spirit. The Druggists in *London* now sell an Hundred Weight, or an hundred and twelve Pounds Averdupois, for thirty-six Shillings.

* In his *Chemistry*, Part II. Process 143. p. 285.

It is easy to ascertain what Quantity of this Spirit will serve any given Number of Men for any given Time, and at what Expence for each Man, on a Presumption that each Man takes twenty Drops, which, dropp'd from common Ounce-Vials, are one Time with another equal to twenty Grains, a Day. Thus 'tis obvious, That one Thousand Men will require two Pounds, nine Ounces, five Drams, and one Scruple, a Day; that is, nine hundred and fifty Pounds, eight Ounces, two Drams, and two Scruples, or somewhat more than an hundred Gallons, a Year; a Pint of Spirit of Salt, Wine Measure, weighing nineteen Ounces. An hundred Gallons are equal to eight Hundred Weight and fifty-four Pounds. This will cost 15*l.* 5*s.* 4*d.* $\frac{1}{2}$; which is not 4*d.* a Year for each Man.

WHILE Sea-Water and Spirit of Salt are thus employ'd internally, it may be of Service, if the Patient should have Ulcers on his Gums, Legs, or any other outward Parts, or Rotteneſs in his Bones, to apply the former externally too. In these Cases then,

then, let the Mouth be frequently gargled with it, and the ulcerated and carious Parts continually cover'd with soft Linen Cloths or Spunges, well wetted with it many times every Day. By this Conduct the Bones will gradually exfoliate, and the Ulcers heal, as they do, by the same Conduct, in *Strumous* Diseases; the Truth of which I have experienced. But to give the greatest Sanction that can be given to the outward Application of Sea-Water, where there are scorbutic Ulcers, it need only be observed, that, as a fit Cure of them, the same is advised by *Hippocrates* *. Sea-Water seems to forward Exfoliation and Incarnation,

* ΠΕΡΙ ΥΓΡΩΝ ΧΡΗΣΙΟΣ, p. 426. per *Foësum*; in which Work there are several useful Things recorded, relating to the external Use of Sea-Water. *Ramazzini* in his Book *de Morbis Artificum*, and in the Chapter *de Piscatorum & Nautarum Morbis*, takes notice of the Passage in *Hippocrates*, here referr'd to. “ *Piscatores*, says he, *Ulceribus esse obnoxios*, Hippocratis Observatio est; etenim *Aquæ marinæ Potum ad Piscatorum Ulcera commendat.*” And he adds, “ *Locum istum egregiè exponit Martianus; cum enim parùm Rationi congruum videatur, Ulceribus Aquam marinam adbibere, quæ Mordacitate suâ irritandi ac Fluxionem promovendi Vim habeat, id rectè tamen Hippocratem præscripsisse ait, sequi-* dem cum *Piscatorum in maritimis Locis degentium Ulcera sunt squalida & sicca, Irritatione inducè ad Suppurationem per-* duci possint, sine quâ *Ulcera sanare est impossibile.*” P. 222.

partly

partly by its antiseptic Virtue, and partly by stimulating the weak Fibres, with which it comes into Contact, into vigorous Contractions; by which Means the divided Vessels are enabled to throw off the Sloughs, stagnating in their Extremities.

I HAVE often thought that this Water, used outwardly, might be more effectual for the Purposes just mentioned, if a small Quantity of Spirit of Salt was added to it. This Opinion is grounded on the Authority of *Conradus Kunrath* *, who commends Spirit of Salt, mix'd with clarified Honey, or with Wine or other Things, as an excellent Application to swell'd and putrid Gums, obstinate Ulcers, and carious Bones.

THE last, but not the least, Advantage of Sea-Water in the Scurvy is to be gain'd by using it as a Cold Bath. Frequent Immersion in the Sea is beneficial in this Disease, not only because it braces the Skin, and so promotes its insensible Discharges, but because it likewise corrects or washes

* In his *Medulla Destillatoria*, Part I. p. 59.

away

away those innumerable putrid Particles on the Surface of the Body, which, being absorbed into the Blood, would aggravate its Corruption. As soon therefore as the Vessels have been pretty well unloaded by repeated Purgation with Salt-Water, and the bad Symptoms begin to decline, I advise the Patient to bathe every Morning, just before he drinks his Water. He ought to dip all over, but not continue long in the Sea. I think this Course of Bathing should never be enter'd on, while there is any inward Unsoundness, or before the Body has been a good deal evacuated, for fear the internal Vessels, on account of the great Stricture which it occasions on the external, should be suddenly over-distended with Blood, and yield to a fatal Extravasion of it.

THE most proper Diet for Seamen, much afflicted with the Scurvy, is the vegetable Part of their Provisions; such as Biscuit, Flour, Oatmeal, Pease, Rice; all which, if they are good in their Kind, conceal an Acid, that opposes Putrefaction. They are good in their Kind, when they
are

are of a proper Age; when they are free from Mustinefs; when Insects have been prevented from breeding in them; or, when bred, have been destroy'd by a Medicine that will not hurt the Provisions. The Way to have them free from Mustinefs, and to prevent Insects from breeding in them, is to keep them dry, and to ventilate them frequently with sweet Air; as Admiral *Boscawen* found in his Voyage to the *East Indies*. When Insects are already bred in them, the Way to destroy them without hurting the Provisions is, to fumigate the Casks, in which they are pack'd, with Brimstone; the Smoke of which, received in a small Quantity into the Lungs, will soon destroy all animal Life. This Operation may safely be perform'd at Sea,* as well as by Land.

THE most improper Food in this Malady are Flesh and Fish of every Sort, whether they have or have not been salted. If they have been salted, and, from the Badness or Leakage or Evaporation of the

* See the Rev. Dr. *Stephen Hales's Philosophical Experiments*, from p. 69 to p. 77.

Pickle,

Pickle, or from the Heat and Moisture of the Air, or from any other Cause, are now turn'd putrid, they will act with a Degree of Malignity not inferior to that of some Poisons. If they have been salted, and are not from Necessity or any Accident yet turn'd putrid, still they will be injurious; for, in human Bodies infected with Scurvy, they, by an easy and natural Transition, will in a few Hours degenerate into a State of Corruption. Nay, if they are ever so fresh, as their Degeneracy will be nearly the same as if they had been salted, they cannot be serviceable. We need not wonder therefore, that the Progress of the Scurvy was not retarded in Lord *Anson's* Squadron, when the whole Crew fed so often on * fresh Hog-Meat, Fowls, Bonitoes, Dolphins, and Albicores.

Of all simple Liquors, the best in the Scurvy is fresh Water; as it promotes Digestion, and dilutes and softens the Blood, more than any other simple Fluid whatever. Let each Man then have an Allowance of six Pints every Day.

* See Lord *Anson's Voyage round the World*, p. 396.

THE great Difficulty, in long Cruizes and Voyages, has been to supply the Wants of a large Number of Men with a sufficient Quantity of sweet Water. But this may be done, without much Trouble or Expence, by a Distillation of Sea-Water,* either before or after it has putrified. Only let it be remember'd, that in the latter Case not more than four Parts in five, and in the former not more than one Part in three, should be distill'd off. †

BUT though pure Water, for common Drink in this Disease, excels every other uncompoundd Liquid, yet it will admit of a considerable Improvement, not always

* This Process will not ever be necessary in a Ship plentifully stock'd with Water, preserved from Corruption by either of the Methods mention'd in Page 37. Dr. Martin Lister in his Book *de Fontibus medicatis Angliæ*, p. 90, has communicated another Method of making Sea-Water sweet, which I will give in his own Words: "*Experimentum de Algâ in Aquâ marinâ aliquoties feci; atque ita Aquam dulcem & potabilem elicere potui, novo distillandi Modo, Nautis quidem optatissimo, & utilissimo fortè futuro; quod sine Invidiâ communico.*"

† Vide The Reverend Dr. Stephen Hales on Distill'd Sea-Water.

necessary

neceſſary indeed, from the Addition of any Sort of Wine. It will be improved by any Sort of Wine, becauſe every fermented inflammable Spirit, prudently diluted and drank with Moderation, invigorates the Conſtitution, and helps to ſecure it from Corruption, without over-heating it. The Dilution may be prudent, when three Quarts of Water are mix'd either with one Quart of any common foreign Wine, or with half a Pint of Rum or Brandy, or any other Rectified Proof-Spirit. I ſay, a Quart of any common foreign Wine, or half a Pint of Proof-Spirit; it being experimentally true, that the Generality of thoſe Wines will not afford in Diſtillation more than about a fourth Part of ſuch Spirit. Such a Compound of Wine or Rum or Brandy and Water, provided the Ingredients are good, ſeems to be full as ſtrong, and cheap, and wholeſome, as the beſt *Engliſh* Small Beer; of which it is needleſs to ſay any thing in this Place, it being unfit for Travellers by Sea, inasmuch as it is ſoon ſpoil'd by continual Shaking and hot Weather.

BUT the noblest Improvement, which fresh Water, as an Anti-scorbutic, is capable of receiving, and which in my Opinion should never be omitted, is from an Addition of some Acid, either vegetable or fossil. For all these Acids, however they may differ in other Respects, undoubtedly agree in their antiseptic Power, whereby they assist in the Scurvy and all other Diseases arising from an internal Putrefaction of the Humours, more than any other Remedies. Yet, as the vegetable Tribe is hardly ever to be got at Sea in any Abundance, we must generally be obliged to use there one of the fossil Kind; of which I think Spirit of Sea-Salt is to be recommended far before the rest, for Reasons already given *. If either Spring or River or Rain or distill'd Sea-Water is moderately impregnated with this Acid, only in the Proportion of five Drops to a Wine Quart, and each Patient has a full Allowance every Day, they may be found to exceed the Virtues of the *Roman Posca*, and to equal

* *Vide* p. 27.

those

those of Whey, Butter-Milk, and the other celebrated Drinks against the Scurvy. Add to this, that the same Proportion * of Spirit of Salt will actually preserve † those Waters, in wooden Casks, from stinking or corrupting, in the hottest Climates, for many Months together, even a Year and longer, as I have been convinced by repeated Experiments. Nay farther, when they are thus preserved, they may be found an excellent and an adequate *Succedaneum* ‡ for that most subtile aërial Acid, which insensibly and unavoidably, and without Intermiſſion, is infused into the Blood in vast Plenty by Land, but which cannot in such

* Which is about an Ounce and half of Spirit of Salt to a Tun of Water.

† The Rev. Dr. *Stephen Hales* has discover'd that three Drops of Oil of Sulphur will preserve a Wine Quart of Water. *Phil. Exper.* p. 59. Mr. *Boyle Godfrey* observes, That three Drops of true Spirit of Vitriol, or one Drop of Oil of Vitriol, will do the same. *Miscell. Exper. and Observ.* p. 136, 137. I have been inform'd by a sensible Distiller, that Rectified Proof-Spirit, in the Proportion of one Part Spirit to seven of Water, will keep Water from corrupting in any Climate for several Years.

‡ *Joachim Becher* in his *Physica Subterranea* (Book I. p. 272.) informs us, That the Universal Acid of the Air is only " *Spiritus Salis Calcis Terrâ alteratus*;" and (p. 42.) that it is perpetually exhaling from the Center of the Earth.

Plenty

Plenty be infused into it by Sea. For these and other Reasons * I am persuaded it would be very happy for Mankind, if this Beverage should ever gain Reputation enough in the World, to be drank in common by all Sea-faring Persons, as well when they are not, as when they are, disorder'd; especially when warm'd by a temperate Mixture of some fermented Spirit, which, as has been said, will mend it, and which Custom has made necessary for most People.

WHILE this Regimen is pursued, it will be proper that the Patient, if he is able, should be employ'd almost every Day in some bodily Labour † or Diversion. It will be ever necessary to keep him clean,

* Vide *Metall. Digest. Conradi Knecht*, Part. LIX. p. 1.

† The Practice of Lord *Anglo*, who order'd his Crew, at all convenient Seasons, almost every Day to be exercis'd in the Management of the Great Guns and in the Use of their Small Arms, deserves to be imitated by the Gentlemen of the Navy; because their Men by this means will help dissipate what would lay the Foundation of Sickness, while they are learning to become more expert and serviceable, in case of Annoyance from an Enemy. See Lord *Anglo's Voyage round the World*, p. 495, 497.

and

and also his Ship and her Crew. The Patient and Crew are kept clean, by frequent Combing, Shaving, Washing, Bathing under * certain Circumstances, Change of Linen, Airing of Hammocks, and proper Dressing of Wounds, Ulcers, and carious Bones. The Ship is kept clean, by a quick Removal of dead Men and tainted Provisions, by frequent Pumping, Scraping, Sweeping, Scouring, Washing with Sea-Water, Sprinkling with Vinegar or Spirit of Wine, and Admission of fresh Air. This last is done by opening the Ports, and by means of a Ventilator †; which every Ship, especially Transport, *Palatine*, and *Guinea*-Slave Ships, ought to be provided with, no less than with a Rudder or with Masts and Sails. The same Machine will likewise be of Service in Hospitals, Work-Houses, Jails, and Mines; for it is certain that in these Places, as well as in the Navy, many Thousands of Lives have been lost from close

* *Vide* p. 31.

† I might have mention'd Wind-Sails, and Mr. Sutton's Pipes too, both which have been found useful; but, where there is a good Ventilator, they seem needless.

foul

foul Air only, which might easily have been saved by proper Ventilation.

THE Description of the Ventilator, the most convenient Place for fixing it on Ship-board, the Manner of working it, its great Usefulness in keeping the Ship dry and sound, in sweetening Water that is corrupted, in preserving Provisions, Gun-powder, Merchandise of almost every Sort, &c. as well as in restoring and preserving the Health of Seamen, the Reader will learn from the Rev. Dr. *Stephen Hales* *, to whom the World is obliged for the Invention of the Ventilator, which is inestimable.

THIS then is the Method, whereby the Scurvy in general may be cured at Sea: But there are particular Cases, which will require some Variation to be made in it. The chief of these are, An immoderate Hæmorrhage, a Diarrhœa, Dysentery, and a Mortification, whenever they arise from the Scurvy. An immoderate Hæmorrhage has been observed to issue from the Surface

* See his *Description of Ventilators*, publish'd in the Year 1743.

G

Water

Water should take place, and be persisted in as long as there shall be Occasion for it. And the same Course will be necessary after the Removal of those other Symptoms, which, during their Continuance, will always dissuade it.

A MODERATE scorbutic Diarrhœa, as it ought not to be encouraged on the one Hand, so neither ought it to be restrain'd on the other; inasmuch as it is an Effort of Nature to throw out of the Body what oppresses it, and what, by a long Abode therein, would destroy it. A Diet consisting of Seeds, and plentiful Dilution with acescent Liquors, by opposing the Cause of the Discharge, are the safest Means of curing it. Nor will the same Measures become improper, though the Drain should be so excessive as to weaken the Patient, or be accompanied with griping Pains or a Dysentery. But then, under the first of those Circumstances, it may be expedient moreover, to give fifteen or twenty Grains of *Rhubarb* every Morning, or every other Morning; half a Grain or a Grain of strain'd *Opium* every Night; and a Glass of plain

plain Wine, or about three Spoonfuls of Rum or Brandy or Arrack, three or four times every Day, till the Complaint ceases. Indeed plain Wines or other spirituous Liquors, in Moderation, seem very fit Medicines for all Persons at Sea, who are much reduced in Strength by the Scurvy, and have no high Degree of Inflammation. In case of a Dysentery, it may not be less expedient to add to the aforesaid Diet, Dilution *, and Medicines, a free Use of the incrassating Gums. But it should be noted, that, under this Circumstance, it in general will be right to give both the *Rhubarb* and *Opium* in larger Doses, and oftener, than where there is only a Diarrhœa.

A MORTIFICATION, derived from Scurvy, sometimes attacks the Lungs or Bowels, and then is incurable; but most commonly

* The Use of Acids in those Fluxes, which arise from a putrid Cause, is not a new Practice. *Hippocrates*, *Sydenham*, *Hoffman*, and others, recommend Cheese-Whey in these Cases. *Dolœus* (in his *Encyclopæd. Med. Lib. III.*) tells us, he hath cured more than an hundred dysenteric Patients by a Mixture of Lemon-Juice and Oil. And his Method is mention'd with Approbation by *Dr. Pringle*, among his excellent Observations on the Diseases of the Army, p. 241.

It seizes the Lips, Gums, Toes, Feet, Legs, and then may be curable. As every Sphaecelus from this Cause denotes putrid Humours and weak Fibres, as well as a Stagnation of Juices in the Limb or Part it affects, the Cure of it must depend on some inward and some outward Applications. The inward Applications are those Medicines, which, exhibited liberally and prudently, have the greatest Power of stopping the Progress of the Mortification, either by correcting or fixing or sweetening the putrid or gangrenous Principle, or by enabling the Vessels to sling it entirely out of the Mass of Blood. Those Medicines *

* The Medicines that oppose Putrefaction are far more numerous, than in general is supposed. "*Aër frigidus & siccus, imprimis calidus & siccus, à Putrefactione præservat. Intensum Frigus quoque, nimia quoque Humiditas, à Putrefactione impedit. Præservantia à Putredine, Subtilia, Ignea, Oleosa & Balsamina, ASTRINGENTIA: Ut Ens Sulphuris, Terebinthus, Aloe, Myrrha, Camphora, Pix; Spiritus Vini, in quo odorifera Balsama soluta sunt; Salia Volatilia, seu Oleosa in Salis Formam & Penetrantiam redacta; Salia Volatilia ex Balsamis Arte parata; Saccharum; Vitriolum, Alumen, Acetum, &c.*" Vide *Joaquini Beccieri Phys. Subterr.* Lib. I. p. 140 ad p. 144.

The sagacious Author of the Passage just quoted has open'd a spacious Field of Knowledge, not less instructive than curious and entertaining. All Antiseptics whatever are

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are the common Spices, Snake-Root, Contrayerva-Root, the Bark, Camphire, Saffron, volatile Salt of Amber, &c. combined with Wine, or Brandy, and Spirit of Salt or any other Acid. The outward Applications are such as either promote the Separation of the Sphacelus, or actually separate and remove it. Of the first Sort are Scarifications to the Quick, when they can be carried so far without wounding live Tendons; and spirituous Fomentations and Cataplasms, where they can be laid on: Of the second are warm Digestives, and, now and then in the Extremities, Amputation. Incisions to the Quick promote the Separation, * by giving Issue to the Sanies of

reducible, perhaps, to one or other of the Classes they are here ranged under. Horse-Radish, Mustard-Seed, Scurvy-Grass, Wormwood, and many other Vegetables, which are term'd anti-scorbutic, and which are commended by reputable Writers as of peculiar Efficacy in the Scurvy, belong to one of these Classes. We see the true Reason then, Why those Vegetables are of such Efficacy in the Scurvy: Why various other Medicines may have a like Efficacy: And why Acids, Alcaline Salts both fix'd and volatile, neutral Salts, fermented Spirits, Spices, Bitters, especially the Bark, &c. some under these Circumstances, some under those, are of such eminent Service in Mortifications.

* See Mr. Sharp's *Critical Enquiry*, p. 251.

the

the Eschar, by lessening the Strangulation of the subjacent Parts, and by making Room for proper Dressings. And spirituous Stupes and Poultices promote the same, by overcoming and as it were embalming the Corruption of the dead Parts, and by cherishing and stimulating the live into strong Vibrations. The Digestives in Use to separate the Mortification are the Lini-ment of *Arceus* and yellow *Basilicon*, warm'd with Oil of Turpentine. These seem to succeed, when the Gangrene has done spreading, and is superficial, affecting only the Skin, *Membrana Adiposa*, and Muscles, by softening and loosening the Eschar, and by enlivening the Parts underneath it into Vigour enough to push it off. But when the Gangrene is deep, penetrating into the Substance of the Bone and Marrow, there can be no Removal of it but by Amputation. The Event of this Operation will ever be most prosperous, if it be * deferr'd till the Mortification is stopp'd, and even advanced in its Separation. As soon as the Operation is perform'd, the Stump must be dress'd like other Wounds, strict Regard

* See Mr. Sharp's *Critical Enquiry*, p. 258.

being

(47)

being constantly had to the Debility of the Solids and Acrimony of the Fluids.

I HAVE now done what I propofed ; and fhall think myfelf well rewarded for my Pains, if I have any way contributed to the Happinefs or Service of Mankind.

F I N I S.







